NATURAL RESOURCES CONSERVATION SERVICE
VIRGINIA TECHNICAL NOTE

Engineering #1

INSTALLATION OF ANIMAL WASTE STORAGE FACILITIES (AWSF) IN A KARST AREA

The need for more stringent installation criteria of Animal Waste Storage Facilities (AWSF) has become evident once again. The installation of an AWSF in a known karst area should be at best discouraged and only supported after the site has undergone and passed a rigorous technical review. The option of installing a natural clay liner in a karst area should be discouraged in favor of a membrane or concrete lined facility.

In a known karst area, it is imperative that our agency strives to ensure that any project we design or sign off on be environmentally sound. The groundwater in the Shenandoah Valley is very susceptible to the influx of pollutants. Limestone, dolomite and shale are the major rock types that form these lowlands. The Shenandoah Valley consistently form the most productive aquifers in Virginia's consolidated rock formations. Limestone and dolomite frequently contains solution channels that store and transmit groundwater. This process can involve massive volumes of water over large distances in a relatively short period of time. It is therefore evident that any structures we install in this area not contribute to the potential for groundwater contamination.

Listed are criteria that should be followed when designing an AWSF in a karst area.

1. A site investigation should be conducted by a Soil Scientist or the State Geologist. This should involve excavating test pits, collecting a soil sample for soil mechanics analysis and a surface reconnaissance of the immediate area.

2. A finding of no inplace rock during the investigation or during construction to two feet below design grade. If bedrock is encountered, the installation should be redesigned to include a membrane or concrete liner.

3. No gray or mottled gray soil as evidenced by a seasonal water table is encountered during the investigation or during construction. If mottled gray soil is encountered, the installation should be redesigned to include a membrane or concrete liner.

4. A soil sample is to be sent to a soil mechanics testing lab and analyzed for permeability. According to our criteria in Virginia Conservation Practice Standard *Waste Treatment Lagoon (Code 359)*, we define an acceptable soil permeability as 1 X 10 – 6 cm/sec. If the soil sample does not achieve this level of permeability or cannot be supplemented by simple means, the site should not be installed as a natural clay liner. If too high permeability soil is encountered, the installation should be redesigned to include a membrane or concrete liner.

5. After construction is complete, an inplace permeability test should be conducted to ensure that the level of 1 X 10 – 6 cm/sec. has been successfully achieved. If the permeability level is too high, remedial action such as recompacting or the addition of chemical sealant should be done to achieve it or the installation should be redesigned to include a membrane or concrete liner.

NOTE: If any one of these conditions is not met, it should precipitate a new design requiring a membrane or concrete liner. If you have any questions as to whether or not a particular site is located in a karst area, call the State Geologist in Richmond.